Course number	U-LAS13 10004 LE60		
Course title (and course title in English)	Basic Physical Chemistry (thermodynamics)-E2 Basic Physical Chemistry (thermodynamics)-E2	Instructor's name, job title, and department of affiliation	Institute of Advanced Energy Senior Lecturer,ARIVAZHAGAN RAJENDRAN

Group	Natural Sciences	Field(Classification)	Chemistry(Foundations)

Language of instruction	English	Old group	Group B	Number of credits	2

Number of weekly time blocks	1	Class style	Lecture (Face-to-face course)	Year/semesters	2026 • First semester

Days and periods	Tue.3	Target year	All students	Eligible students	For science students

[Overview and purpose of the course]

We learn about the thermodynamics in the state-change of matter, also in the chemical reactions. Contents of the lecture covers the following fields of change of state, thermodynamic laws, definition of the quantities (enthalpy, entropy, free energy, chemical potential), chemical equilibrium, and reaction kinetics. Aim of this course is the understanding of these concepts.

[Course objectives]

The aim of this class is to understand the basic principles of thermodynamics.

[Course schedule and contents)]

1. Change of the system and quantity of state
2. Thermal energy and work
3. 1st law of thermodynamics: Change of internal energy and enthalpy
4. Chemical reaction and thermal energy
5. Interpretation of internal energy in molecular level
6. Change of state of the ideal gas
7. 2nd law of thermodynamics: Entropy
8. Entropy change in the change of state
9. 3rd law of thermodynamics: Conversion from heat to work
10. Gibbs energy
11. Change of the Gibbs energy when temperature and pressure change
12. Chemical potential
13. Change of state and chemical potential change of matter
14. Chemical equilibrium and rate of chemical reaction
15. Assignment which is considered as a term examination
16. Feedback

[Course requirements]

None

Continue to Basic Physical Chemistry (thermodynamics)-E2(2)↓↓↓

Basic Physical Chemistry (thermodynamics)-E2(2)

[Evaluation methods and policy]

Results will be evaluated by the submission of homework written in English (30%), attendance and discipline (20%), and assignment which is considered as a term examination (50%).

[Textbooks]

Yunus A. Cengel and Michael A. Boles 『Thermodynamics: An Engineering Approach, 8th Edition in SI Units』 （McGraw-Hill Education） ISBN:978-981-4595-29-2
Peter Atkins and Julio de Paula 『Atkins' Physical Chemistry, 10th Edition』 （Oxford University Press） ISBN:978-0-19-969740-3

[References, etc.]

（References, etc.）
Introduced during class

[Study outside of class (preparation and review)]

I recommend that the students should review the points to be learned.

[Other information (office hours, etc.)]

Office hours are set at 15:00-17:00 in every Friday.

[Essential courses]

Faculty of Science